

Patent claims:

1. Drilling pipe (10) for a drill column (3) for deep wells, having a drilling pipe body (12) made from an electrically conductive material, at least one electrical pipe conductor (7a) being passed through the drilling pipe body (12), the pipe conductor (7a) being connected to a pipe contact connection (13) provided at one end on the drilling pipe body (12), and the pipe conductor (7a) and the pipe contact connection (13) being electrically insulated from the drilling pipe body (12), **characterized** in that the pipe conductor (7a) is fixed to the pipe inner side (14), and in that a longitudinal groove (15) for at least one pipe conductor (7a) is provided on the pipe inner side (14) of the drilling pipe body (12).
2. Drilling pipe according to Claim 1, characterized in that the depth of the groove (15) is greater than the diameter of the pipe conductor (7a), and in that, preferably, the pipe conductor (7a) is cast into the groove (15) via an insulation (16).
3. Drilling pipe according to one of the preceding claims, characterized in that the pipe conductor (7a) is sheathed by a conductor insulation.
4. Drilling pipe according to one of the preceding claims, characterized in that an electrical insulating layer (18) is applied, in particular vapour-deposited, over the entire surface of the pipe inner side (14), and in that, preferably, the insulating layer (18) covers the pipe conductor (7a).
5. Drilling pipe (10) for a drill column (3) for deep wells, having a drilling pipe body (12) made from an electrically conductive material, at least one electrical pipe conductor (7a) being provided, the pipe conductor (7a) being connected to a pipe contact

connection (13) provided at one end on the drilling pipe body (12), and the pipe conductor (7a) and the pipe contact connection (13) being electrically insulated from the drilling pipe body (12),
5 **characterized** in that the pipe conductor (7a) is tubular, in that the pipe conductor (7a) is passed through the drilling pipe body (12) and/or sheaths the drilling pipe body (12), and in that, preferably, the pipe conductor (7a) and the drilling pipe body (12)
10 have essentially the same linear thermal expansion behaviour.

6. Drilling pipe according to Claim 5, characterized in that the pipe conductor (7a) and the drilling pipe
15 body (12) are produced from the same material, preferably from steel.

7. Drilling pipe according to Claim 5 or 6, characterized in that the pipe conductor (7a) is
20 connected to the drilling pipe body (12) in a cohesive and/or force-fitting manner.

8. Drilling pipe according to one of Claims 5 to 7, characterized in that a gap of 0.5 cm to 2.5 cm,
25 preferably of 1.5 cm, is provided between the pipe conductor (7a) and the drilling pipe body (12), and in that, preferably, the gap is filled with a casting compound, in particular with epoxy resin.

9. Drilling pipe according to one of the preceding claims, characterized in that the pipe contact
30 connection (13) is provided on the end-side front face (19) of the drilling pipe body (12).

10. Drilling pipe according to one of the preceding claims, characterized in that the pipe contact
35 connection (13) is of circumferential design, and in that, preferably, the pipe contact connection (13) is arranged on an insulating ring (20) resting on the

front face (19), and in that, further preferably, an annular groove (21) is provided in the insulating ring (20), which is made from an elastic material, for the purpose of accommodating the pipe contact connection (13), and in that the annular groove (21) is deeper than the height of the pipe contact connection (13).

11. Drilling pipe according to one of the preceding claims, characterized in that the pipe contact connection (13) is spring-loaded in particular in the direction away from the front face (19) and/or in that outwardly protruding contact tongues are provided on the pipe contact connection (13).

12. Drilling pipe according to one of the preceding claims, characterized in that at least one circumferential seal is provided in the region of the pin (22) of the drilling pipe body (12), and in that a seal (26) is provided on the step (24) from the pipe outer side (25) to the pin (22) and/or at the transition between the step (24) and the pin (22).

13. Bush (11) for a drill column (3) for deep wells, having a bush body (27) made from an electrically conductive material, at least one electrical bush conductor (7b) being passed through the bush body (27), the bush conductor (7b) being connected to a bush contact connection (28) provided at one end on the bush body (27), and the bush conductor (7b) and the bush contact connection (28) being electrically insulated from the bush body (27), **characterized** in that the bush conductor (7b) is fixed to the bush inner side (29), and in that a longitudinal groove (30) for at least one bush conductor (7b) is provided on the bush inner side (29) of the bush body (27).

14. Bush according to Claim 13, characterized in that the depth of the groove (30) is greater than the diameter of the bush conductor.

15. Bush according to either of Claims 13 and 14, characterized in that the bush conductor (7b) is cast into the groove (30) via an insulation.

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16. Bush according to one of Claims 13 to 15, characterized in that the bush conductor (7b) is sheathed by a conductor insulation.

10 17. Bush according to one of Claims 13 to 16, characterized in that an electrical insulating layer (31) is applied, in particular vapour-deposited, over the entire surface of the bush inner side, and in that, preferably, the insulating layer (31) covers the bush
15 conductor (7b).

18. Bush (11) for a drill column (3) for deep wells, having a bush body (27) made from an electrically conductive material, at least one electrical bush
20 conductor (7b) being passed through the bush body (27), the bush conductor (7b) being connected to a bush contact connection (28) provided at one end on the bush body (27), and the bush conductor (7b) and the bush contact connection (28) being electrically insulated
25 from the bush body (27), **characterized** in that the bush conductor (7b) is tubular, in that the bush conductor (7b) is passed through the bush body (27) and/or sheaths the bush body (27), and in that, preferably, the bush conductor (7b) and the bush body (27) have
30 essentially the same linear thermal expansion behaviour.

19. Bush according to Claim 18, characterized in that the bush conductor (7b) and the bush body (27) are
35 produced from the same material, preferably from steel.

20. Bush according to Claim 18 or 19, characterized in that the bush conductor (7b) is connected to the bush body (27) in a cohesive and/or force-fitting manner.

21. Bush according to one of Claims 18 to 20, characterized in that a gap of 0.5 cm to 2.5 cm, preferably of 1.5 cm, is provided between the bush conductor (7b) and the bush body (27), and in that, preferably, the gap is filled with a casting compound, in particular with epoxy resin.
22. Bush according to one of Claims 13 to 21, characterized in that the bush contact connection (28) is provided on a front-side shoulder (32) to the bush inner side (29).
23. Bush according to one of Claims 13 to 22, characterized in that the bush contact connection (28) is of circumferential design, and in that the bush contact connection (28) is arranged on an insulating ring (20) resting on the shoulder (32).
24. Bush according to one of Claims 13 to 23, characterized in that an annular groove is provided in the insulating ring (20), which is made from an elastic material, for the purpose of accommodating the bush contact connection (28), and in that the annular groove (21) is deeper than the height of the bush contact connection (28).
25. Bush according to one of Claims 13 to 24, characterized in that the bush contact connection (28) is spring-loaded in particular in the direction away from the shoulder (32) and/or in that outwardly protruding contact tongues are provided on the bush contact connection (28).
26. Bush according to one of Claims 13 to 25, characterized in that at least one circumferential seal (35) is provided on the outer front face (34) of the bush body (27).

27. Drill column (3) for deep wells, having a plurality of drilling pipes (10) having drilling pipe bodies (12) made from an electrically conductive material and a plurality of bushes (11) having bush bodies (27) made from an electrically conductive material, having at least one drilling pipe (10) according to one of the preceding claims and at least one bush (11) according to one of the preceding claims, one electric pole being formed by the drill column body comprising the drilling pipe bodies (12) and the bush bodies (27), and the other electric pole being formed by at least one conductor (7), which is electrically insulated from the drill column body and is arranged within the drill column body, and, preferably, the pipe contact connection (13) and the bush contact connection (28) being designed and arranged such that, when the drilling pipe (10) and the bush (11) are screwed together, an electrical connection results.
28. Drill column according to Claim 27, characterized in that a slipring collector, which is insulated from the drilling pipe body (12) and is connected to the pipe conductor (7), is provided on the first drilling pipe (10).